Remarks

The Office Action mailed December 23, 2004 has been carefully reviewed and the foregoing amendment has been made in consequence thereof.

Claims 1-13 and 15-20 are now pending in this application. Claims 1-13 and 15-20 stand rejected.

The objection to the drawings under 37 CFR 1.83(a) is respectfully traversed. Applicants have amended Claim 17 to recite "at least one flow outlet positioned on an opposite side of said at least one removable support block...." Applicants respectfully submit that every feature of the invention specified in the Claims is shown in the Figures. For the reasons set forth above, Applicants request that the objections to the drawings be withdrawn.

The objection to the Specification is respectfully traversed. Specifically, paragraph 0030 has been amended to recite "guide tubes (not shown)". For the reasons set forth above, Applicants respectfully request that the objection to the Specification be withdrawn.

The rejection of Claim 17 under 35 U.S.C. § 112, first paragraph is respectfully traversed. Specifically, with regard to Claim 17, Claim 17 has been amended to recite "at least one flow outlet positioned on an opposite side of said at least one removable support block...." Accordingly, for the reasons set forth above, Applicants respectfully request that the rejection of Claim 17 under Section 112, first paragraph, be withdrawn.

The rejection of Claims 1-6 and 13-15 under 35 U.S.C. § 102(b) as being anticipated by Anthony (U.S. Patent No. 4,127,445) is respectfully traversed.

Anthony describes a lower core support structure (18) for a nuclear reactor (10). The support structure includes a plurality of support beams (19 and 21) forming a grid network of support beams. Metal pads (22) and alignment pins (23) are welded to the upper surface of the support beams. Fuel assemblies (16) are supported and aligned by the pads and pins. A portion of the fuel assemblies, namely a lower end fitting (38) rests on the pads. Specifically,

alignment posts (60) extend downward from a lower end plate (54), and a bottom surface of the alignment posts rest on the top surface of the pads. Notably, the alignment posts do not contact the support beams.

Claim 1 recites an apparatus for supporting fuel assemblies in a reactor pressure vessel including a core, wherein the apparatus includes "a plurality of support beams...at least one removable support plate disposed on said plurality of support beams, each said removable support plate comprising at least one groove configured to mate with one of said plurality of support beams."

Anthony does not describe nor suggest an apparatus for supporting fuel assemblies as recited in Claim 1. More specifically, Anthony does not describe nor suggest an apparatus having a removable support plate including at least one groove configured to mate with a support beam. Rather, in contrast to the present invention, Anthony describes a support structure having a plurality of support beams, metal pads, and alignment pins, wherein fuel assemblies are supported and aligned by the pads and pins. Specifically, alignment posts extend downward from a lower end plate of the fuel assemblies and a bottom surface of the alignment posts rest on a top surface of the pads. Notably, Anthony does not describe nor suggest a support plate groove mating with the support beams. In fact, the fuel assemblies described in Anthony do not even contact the support beams. Rather, and in contrast to the present invention, the fuel assemblies rest upon the metal pads.

Additionally, Applicants respectfully traverse the suggestion in the Office Action, at page 8, that Anthony describes a removable support plate including at least one groove configured to mate with a support beam. Specifically, the Office Action recites "each said removable plate (54) comprising at least one groove (4 grooves labeled (62)) configured to mate with one of said plurality of support beams (via beam/protrusion combination 19, 21, 22, and 23)." Applicants respectfully submit that the depressions (62) described in Anthony are NOT configured to mate with the support beams as suggested in the Office Action. Rather, each cylindrical depression merely receives and engages an upwardly extending

alignment pin (23). *See Col. 4, lines 34-37.* Notably, Anthony does not describe or suggest that the cylindrical depressions engage the support beams. Accordingly, for the reasons set forth above, Applicants submit that Claim 1 is patentable over Anthony.

Claims 2-6 depend from independent Claim 1. When the recitations of Claims 2-6 are considered in combination with the recitations of Claim 1, Applicants respectfully submit that dependent Claims 2-6 likewise are patentable over Anthony.

Claim 13 recites a nuclear reactor including "a reactor pressure vessel...a reactor core located inside said reactor pressure vessel...a core plate located inside said reactor pressure vessel, said core plate including a plurality of support beams; and at least one removable support plate disposed on said plurality of support beams, each said removable support plate comprising at least one groove configured to mate with one of said plurality of support beams."

Anthony does not describe nor suggest a nuclear reactor as recited in Claim 13. More specifically, Anthony does not describe nor suggest a nuclear reactor having a removable support plate including at least one groove configured to mate with a support beam. Rather, in contrast to the present invention, Anthony describes a support structure having a plurality of support beams, metal pads, and alignment pins, wherein fuel assemblies are supported and aligned by the pads and pins. Specifically, alignment posts extend downward from a lower end plate of the fuel assemblies and a bottom surface of the alignment posts rest on a top surface of the pads. Notably, Anthony does not describe nor suggest a support plate groove mating with the support beams. In fact, the fuel assemblies described in Anthony do not even contact the support beams. Rather, and in contrast to the present invention, the fuel assemblies rest upon the metal pads. Accordingly, for the reasons set forth above, Applicants submit that Claim 13 is patentable over Anthony.

Claims 14-15 depend from independent Claim 13. When the recitations of Claims 14-15 are considered in combination with the recitations of Claim 13, Applicants respectfully submit that dependent Claims 14-15 likewise are patentable over Anthony.

For the reasons set forth above, Applicants respectfully request that the Section 102 rejection of Claims 1-6 and 13-15 be withdrawn.

The rejection of Claims 9 and 12 under 35 U.S.C. § 102(b) as being anticipated by Japanese Patent 62-5197 ("62-5197") is respectfully traversed.

As best understood by Applicants, 62-5197 describes a support assembly (16) for supporting a fuel assembly (8) and providing fluid flow to the fuel assembly. Specifically, the support assembly extends between adjacent support pieces (10). Each support piece includes a guide tube opening (12) and flow passages (13) extending therethrough. The support assembly is coupled to the flow passages of adjacent support pieces. The support assembly also includes a fuel assembly opening (9) configured to couple with and support a fuel assembly.

Claim 9 recites a support plate including "a top surface...a bottom surface spaced apart from said top surface by a thickness, said bottom surface having at least one groove configured to locate said support plate along corresponding support beams...a guide tube opening through said thickness...at least one flow passage through said thickness."

62-5197 does not describe nor suggest a support plate as recited in Claim 9. More specifically, 62-5197 does not describe nor suggest a support plate including a bottom surface having at least one groove configured to locate the support plate along a support beam. Rather, in contrast to the present invention, 62-5197 illustrates at Figures 7, 8(a) and 8(b) a support assembly (16) for supporting a fuel assembly (8), wherein the support assembly is coupled to flow passages (13) of adjacent support pieces (10), and wherein the support assembly includes a fuel assembly opening (9) configured to be coupled to the fuel assembly. Notably, the bottom surface of the support assembly illustrated in Figures 7, 8(a), and 8(b) is NOT configured to locate the support assembly along a support beam, such as support beam (6) shown in the Figures. Rather, the support assembly engages the support pieces.

Additionally, Applicants traverse the suggestion in the Office Action, at pages 4 and 5, that 62-5197 describes a support plate including a bottom surface having at least one groove configured to locate the support plate along a support beam. Specifically, the Office Action recites that "the support plate (10) including a bottom surface (area near flow passages (11)) has a circumferential groove (not labeled in Figures 4 or 7, but considered to be the line in the area between items ((13) and (11)) configured to locate the support plate along a support beam ((6) or (106))." Rather, Applicants respectfully submit that the line in the area between items ((13) and (11)) is NOT positioned on the bottom surface of the support plate. Additionally, Applicants respectfully submit that the portion of the support plate referenced by the Examiner in the Office Action is not a groove. Moreover, Applicants respectfully submit that the portion of the support plate referenced by the Examiner does not locate the support plate along support beams. Accordingly, for the reasons set forth above, Applicants submit that Claim 9 is patentable over 62-5197.

Claim 12 depends from independent Claim 9. When the recitations of Claim 12 are considered in combination with the recitations of Claim 9, Applicants respectfully submit that dependent Claim 12 likewise is patentable over 62-5197.

For the reasons set forth above, Applicants respectfully request that the Section 102 rejection of Claims 9 and 12 be withdrawn.

The rejection of Claims 1-9 under 35 U.S.C. § 103 as being unpatentable over Anthony in view of 62-5197 is respectfully traversed.

Anthony and 62-5197 are described above.

In addition to the arguments set forth above, Anthony and 62-5197, alone or in combination, do not describe nor suggest an apparatus for supporting fuel assemblies as recited in Claim 1. More specifically, Anthony and 62-5197, alone or in combination, do not describe nor suggest an apparatus having a removable support plate including at least one groove configured to mate with a support beam. Rather, in contrast to the present invention,

Anthony describes a support structure having a plurality of support beams, metal pads, and alignment pins, wherein fuel assemblies are supported and aligned by the pads and pins, and 62-5197 describes a support assembly for supporting a fuel assembly, wherein the support assembly coupled to flow passages of adjacent support pieces, and wherein the support assembly includes a fuel assembly opening configured to be coupled to and support a fuel assembly. Accordingly, for the reasons set forth above, Applicants submit that Claim 1 is patentable over Anthony and 62-5197, alone or in combination.

Claims 2-8 depend from independent Claim 1. When the recitations of Claims 2-8 are considered in combination with the recitations of Claim 1, Applicants respectfully submit that dependent Claims 2-8 likewise are patentable over Anthony and 62-5197, alone or in combination.

Anthony and 62-5197, alone or in combination, do not describe nor suggest a support plate as recited in Claim 9. More specifically, Anthony and 62-5197, alone or in combination, do not describe nor suggest a support plate including a bottom surface having at least one groove configured to locate the support plate along a support beam. Rather, in contrast to the present invention, Anthony describes a support structure having a plurality of support beams, metal pads, and alignment pins, wherein fuel assemblies are supported and aligned by the pads and pins, and 62-5197 describes a support assembly for supporting a fuel assembly, wherein the support assembly coupled to flow passages of adjacent support pieces, and wherein the support assembly includes a fuel assembly opening configured to be coupled to and support a fuel assembly. Accordingly, for the reasons set forth above, Applicants submit that Claim 9 is patentable over Anthony and 62-5197, alone or in combination.

Further, Applicants submit that it would not be obvious to modify the teachings of Anthony with the teachings of 62-5197. Obviousness cannot be established by merely suggesting that it would have been obvious to one of ordinary skill in the art to modify Anthony using the teachings of 62-5197. More specifically, as is well established, obviousness cannot be established by combining the teachings of the cited art to produce the

claimed invention, absent some teaching, suggestion, or incentive supporting the combination. Anthony and 62-5197, alone or in combination, do not describe nor suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicants respectfully submit that it would not be obvious to one skilled in the art to combine Anthony with 62-5197 because there is no motivation to combine the references suggested in the art. Rather, the Examiner has not pointed to any prior art that teaches or suggests to combine the disclosures, other than Applicants' own teaching.

As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levengood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicants' disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion nor motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

For the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 1-9 be withdrawn.

The rejection of Claims 10 and 11 under 35 U.S.C. § 103 as being unpatentable over Anthony in view of 62-5197, and further in view of Berglund et al. (U.S. Patent Number 3,888,732) ("Berglund") is respectfully traversed.

At least for the reasons explained above, Claim 9 is patentable over Anthony and 62-5197, alone or in combination. Berglund describes a nuclear reactor having fuel assemblies (1) positioned on supporting members (6) and control rods (7) arranged in guide tubes (8) between fuel rods (2) inside the fuel assemblies. The supporting members are secured in and supported by the bottom wall of the tank.

Anthony, 62-5197, and Berglund, alone or in combination, do not describe nor suggest a support plate as recited in Claim 9. More specifically, Anthony, 62-5197, and Berglund, alone or in combination, do not describe nor suggest a support plate including a bottom surface having at least one groove configured to locate the support plate along a support beam. Rather, in contrast to the present invention, Anthony describes a support structure having a plurality of support beams, metal pads, and alignment pins, wherein fuel assemblies are supported and aligned by the pads and pins, 62-5197 describes a support assembly for supporting a fuel assembly, wherein the support assembly coupled to flow passages of adjacent support pieces, and wherein the support assembly includes a fuel assembly opening configured to be coupled to and support a fuel assembly, and Berglund merely describes a nuclear reactor having fuel assemblies positioned on supporting members which are secured in and supported by the bottom wall of the tank. Accordingly, for the reasons set forth above, Applicants submit that Claim 9 is patentable over Anthony, 62-5197, and Berglund, alone or in combination.

Claims 10 and 11 depend from independent Claim 9. When the recitations of Claims 10 and 11 are considered in combination with the recitations of Claim 9, Applicants respectfully submit that dependent Claims 10 and 11 likewise are patentable over Anthony, 62-5197, and Berglund, alone or in combination.

For the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 10 and 11 be withdrawn.

The rejection of Claims 13-18 under 35 U.S.C. § 103 as being unpatentable over Chaki et al. (U.S. Patent 6,141,397) ("Chaki") in view of Anthony is respectfully traversed.

Anthony is described above. Chaki describes a boiling water reactor having a plurality of fuel assemblies (2). Upper end portions of the fuel assemblies are supported by an upper lattice plate (4) fixed to a core shroud (3). A core lower portion supporting plate (6) is mounted to the core shroud and is positioned at a lower end portion of the core. Control rods (11) are inserted between the fuel assemblies through guide pipes (5). Fuel support

pieces (10) are arranged on a top portion of the control rod guide pipes. The fuel assemblies are coupled to insertion holes (10a) in the fuel support pieces. The load of the fuel assemblies is supported by a bottom plate (8a) by transferring the load through the fuel support pieces, into the control rod guide pipes, and eventually to the bottom plate. Orifices (10b) are defined in the side walls of the fuel support pieces for directing coolant to the insertion holes.

Chaki and Anthony, alone or in combination, do not describe nor suggest a nuclear reactor as recited in Claim 13. More specifically, Chaki and Anthony, alone or in combination, do not describe nor suggest a nuclear reactor having a removable support plate including at least one groove configured to mate with a support beam. Rather, in contrast to the present invention, Chaki describes a boiling water reactor including fuel support pieces arranged on a top portion of control rod guide pipes and coupled to corresponding fuel assemblies, wherein the load of the fuel assemblies is supported by a bottom plate by transferring the load through the fuel support pieces, into the control rod guide pipes, and eventually to the bottom plate, and Anthony describes a support structure having a plurality of support beams, metal pads, and alignment pins, wherein fuel assemblies are supported and aligned by the pads and pins. Notably, neither Chaki nor Anthony describe a support plate having a groove configured to mate with a support beam. Accordingly, for the reasons set forth above, Applicants submit that Claim 13 is patentable over Chaki and Anthony, alone or in combination.

Claims 14-18 depend from independent Claim 13. When the recitations of Claims 14-18 are considered in combination with the recitations of Claim 13, Applicants respectfully submit that dependent Claims 14-18 likewise are patentable over Chaki and Anthony, alone or in combination.

For the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 13-18 be withdrawn.

The rejection of Claims 19 and 20 under 35 U.S.C. § 103 as being unpatentable over Chaki in view of Anthony, and further in view of Drecker et al. (U.S. Patent 5,943,385) ("Drecker") is respectfully traversed.

At least for the reasons explained above, Claim 13 is patentable over Chaki and Anthony, alone or in combination. Drecker describes a transition piece (32) for insertion into, and directing of coolant from, a passage (40) extending through a core support plate (41). The transition piece includes a rim configured to form a sealing connection with the passage, an enlargement area, and an upper part configured to support fuel assemblies. Coolant is directed through the passage, the transition piece, and into the fuel assemblies.

Chaki, Anthony, and Drecker, alone or in combination, do not describe nor suggest a nuclear reactor as recited in Claim 13. More specifically, Chaki, Anthony, and Drecker, alone or in combination, do not describe nor suggest a nuclear reactor having a removable support plate including at least one groove configured to mate with a support beam. Rather, in contrast to the present invention, a boiling water reactor including fuel support pieces arranged on a top portion of control rod guide pipes and coupled to corresponding fuel assemblies, wherein the load of the fuel assemblies is supported by a bottom plate by transferring the load through the fuel support pieces, into the control rod guide pipes, and eventually to the bottom plate, Anthony describes a support structure having a plurality of support beams, metal pads, and alignment pins, wherein fuel assemblies are supported and aligned by the pads and pins, and Drecker merely describes a transition piece for insertion into, and directing of coolant from, a passage extending through a core support plate. Accordingly, for the reasons set forth above, Applicants submit that Claim 13 is patentable over Chaki, Anthony, and Drecker, alone or in combination.

Claims 19 and 20 depend from independent Claim 13. When the recitations of Claims 19 and 20 are considered in combination with the recitations of Claim 13, Applicants respectfully submit that dependent Claims 19 and 20 likewise are patentable over Chaki, Anthony, and Drecker, alone or in combination.

For the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 19 and 20 be withdrawn.

In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully Submitted,

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